IMPERIAL FORESTRY INSTITUTE
23 JUL 1946
OXFORD

The Imperial Forestry Institute University of Oxford

TWENTY-FIRST ANNUAL REPORT

1944—45

Oxford
THE HOLYWELL PRESS, LTD.
1946

UNIVERSITY OF OXFORD

TWENTY-FIRST ANNUAL REPORT OF THE IMPERIAL FORESTRY INSTITUTE ACADEMIC YEAR, 1944—45

THERE was no significant change from the previous year in the general position with regard to the number of students, which remained extremely low for the same reasons, *i.e.*, the practically complete lack, owing to war conditions, of students with the necessary qualifications for admission to the normal courses. The chief group was formed by seven probationary officers of the Colonial Forest Service who returned for the second year of their course after completing an 'Apprentice Tour' in the Colonies. These students came with practical experience obtained in Nigeria, Sierra Leone, Uganda and Tanganyika: all completed the course and passed the degree examination.

One advanced student for D.Phil. completed his work and presented his thesis on 'The Natural Vegetation of Trinidad and Tobago, B.W.I.' which was approved. Another student was awarded a D.Phil. on a thesis on 'Co-operation and Credit in Forestry,' his work being subsequently published by the Imperial Forestry Bureau.

Only two students, one of them of Polish nationality, took the first year of the undergraduate course.

The practical field work was again carried out in the Forest of Dean, the New Forest area, and the Hampden Woods in the Chilterns. The Department is indebted to H.M. Forestry Commissioners, and the Earl of Buckinghamshire (through his agent, Mr. O'Hara Taylor) for making available the desired facilities in these places.

In place of the formerly customary Continental tour, a three-weeks' tour was made in England in July, visiting Forestry Commission forests, privately-owned woodlands, and various timber industry mills, factories, etc. Travelling and accommodation difficulties severely restricted arrangements and it was found necessary to base the tour on four centres, *viz.*, Lyndhurst (New Forest), Tintern (Wye Valley), Llandovery (South Wales) and Thetford (East Anglia), taking in as many points of forestry interest as could be seen between them, or reached from them on a very limited petrol supply. The officers of the Forestry Commission gave every possible help in connection with this tour, as also on the weekly excursions made during the summer term. These excursions included visits to the Forest Products Research Laboratory, Princes Risborough),

Bramshill, Ebworth, Hazelborough, Parmoor Woods, Wolvercote Paper Mill. After the end of the year, the Professor made a tour in Sweden to examine the possibilities of making a students' tour there next summer; the prospects appeared to be encouraging and a most instructive tour could be made as soon as transport facilities to Sweden become available.

Wytham Woods proved useful in connection with several special studies undertaken by the senior students. Owing to the difficulty in finding a forester or woodman but little progress was made in bringing the woods under management, but finally a forester was appointed and the work commenced on a nursery which is already serving for some small experiments on composts. Underwood fellings were made by the Ministry of Supply and a small parcel of timber (50 trees) was sold from the area where improvement works will begin. Bagley Wood continues to be of the greatest value to the Institute for instructional purposes and we owe much to St. John's College for the way it has for so many years allowed us free use of the wood. The adjoining Forestry Commission nursery at Kennington, which the College has permitted to be further extended on their land, has also been very useful, and the Research Forester's (Mr. Gray's) able demonstrations of the work and experiments in progress there have been greatly appreciated by staff and students alike.

Reference was made in last year's report to the elevation of Forestry in the University to the status of an Honour School. The first examination was held in June, 1945, and it may be recorded that Mr. J. F. Hughes, of the Tanganyika Forest Department, was the first candidate to be awarded First Class Honours. It may also be noted that one of the innovations, permitting students to offer an approved special subject, worked out well, though somewhat difficult to fit into the timetables and throwing an additional burden on the teaching staff and examiners; the work is felt to have considerable educational value and often a direct practical value as well. The subject is chosen to suit the interest and ability of the student, and in the case of the Colonial Forest Service probationers, was often one which his Department wanted him to take up; too wide a field was avoided so that in the time available, the student could read and summarise all the existing literature on it, and if the subject permitted, he could also undertake some field or laboratory work. In any case, he is expected to discuss the further development of the selected subject in the theory and practice of forestry.

The new University Lecturer's post in the Design and Analysis of Scientific Experiment was filled by the appointment of Mr. D. J. Finney. It may also be noted that during the year Mr. D. G. Champernowne has been appointed Director of the Institute of Statistics. It will be of the greatest assistance to the Institute staff with statistical problems, particularly to the members concerned with mensuration and analysis of experimental data, to have the advice

of these specialists. Incidentally, the Institute now has a small statistical section which is for the present in Mr. Day's charge.

The research work carried out during the year was very largely a continuation of that done during the previous year and is described below under the several subjects. Its main feature may perhaps be considered to be the close co-operation with the research staff of the Forestry Commission and special attention to the practical problems arising in the plantations. Close co-operation with the Soil Science Laboratory under Mr. C. G. T. Morison has also been continued. This will be taken a stage further with the appointment after the end of the year of a research team of three members, a microbiologist, an ecologist, and a physiologist, to work with the existing Institute staff and that of the Soil Science Laboratory on the problems of the relations between the soil and tree growth.

Just after the end of the year under report, it was learnt that the Secretary of State for the Colonies approved a project under the Colonial Development and Welfare Act for the grant of half the cost of a new Institute building subject to a maximum of £45,000 on certain conditions which can be met. The University's estimate of the total cost, including equipment, is £90,134.

It can at last (October, 1945) be reported that the collection of materials for the building has begun, as well as the levelling of the site and laying out the plan. The main credit for this must be given to Sir Ralph Furse, who has taken the keenest interest in improving the facilities provided by the Institute and in forwarding the plans for providing it with a more suitable home.

It is, fortunately, possible to report that the financial provision for the maintenance and functioning of the Institute, which was very uncertain at the beginning of the year, has been put on a much more satisfactory footing, and the position is now assured up to 1951. Particulars are given on page 21.

SILVICULTURE

Dr. E. W. Jones continued teaching work as usual for both first and second year courses and advanced studies.

The accounts of Sycamore (*Acer pseudoplatanus*) and Field Maple (*A. campestre*) for the Ecological Society's Biological Flora were published this year (*Journ. of Ecology*, Vol. 32); work on the accounts of the Oaks continues. A paper was published on 'The Structure and reproduction of the virgin forest of the North Temperate Zone' (*New Phytologist*, 44 (2), 1945).

A series of permanent transects have been laid out and some preliminary notes made on the Lady Park Nature Reserve in the High Meadow Woods.

Wytham Woods. A preliminary examination and description of the

woods have been made and proposals for their silvicultural treatment formulated in connection with the preparation of a working plan.

Correlation of height growth with soil depth and the topographical factors, elevation, aspect and slope. Data collected in Mynydd Ddu Forest during the soil survey made of that area have been analysed statistically under Mr. Day's direction and correlations found to exist between height growth of European larch, Japanese larch, Sitka spruce and Scots pine and one or more of these factors. This work brings out the frequently misleading character of direct observation, and the necessity of isolating the influence of any one factor under consideration from that of others acting simultaneously, if the importance of its real influence on growth is to be determined.

The correlation between elevation and height growth of crop was also further examined in connection with the data collected in war felling areas in 1940 and 1941. It had been shown that height quality was negatively correlated with elevation but that this correlation might be obscured if data collected in regions of different topographical type were confounded. An attempt has been made to determine what might reasonably be considered a normal relation between height quality and elevation for Norway spruce and European larch in hilly country in the west and north of Britain. Some interesting and useful relationships have been found and it is hoped to report on this work during 1945.

Caio Forest Survey. Much time has been devoted by Dr. E. W. Jones to working up the ecological data collected in the course of the soil and vegetation survey undertaken in Caio Forest, Carmarthenshire.

Two reports have been made by Mr. Day to the Forestry Commission in connection with the manner of growth of the plantations. In the first, it was demonstrated that there were clear indications that rates of growth were significantly different on different soil types as determined by the soil survey, and that different species might react in different ways to a change in soil type. The second report reviewed the plantings made on the soil types on which mensuration data were collected and critically examined the relative success of the different species used. It was demonstrated that disappointing results were being obtained from an appreciable proportion of both the Norway and Sitka spruce plantings. This work suggested the need for further critical examination of the factors affecting the growth of the principal species being used in afforestation in this country in order that more exact knowledge may be obtained of the conditions which determine vigour of growth in different regions.

Mr. R. G. Sanzen-Baker, Forestry Commission Research Officer for England and Wales, continued to be attached to the Institute. Apart from the purely Forestry Commission research problems and projects, considerable progress has been made in the European larch d'-back investigation in collaboration with Mr. Day. Work on this

project included two tours of inspection, one in Scotland and the other in Wales. Further assessments have been made and much statistical analysis work has been done on the data collected. These further observations have not led to any change in the earlier tentative conclusion that frost in association with topography and provenance of seed is a major factor in the complex associated with the disease. Die-back of pines, particularly Corsican pine, has also received the attention of Mr. Day and Mr. Sanzen Baker.

The improvement and maintenance of soil fertility has been the main theme of the forest nursery research work which has been continued by the Forestry Commission research staff at Kennington and Bagley Wood nurseries. Also trial sowings with various specially prepared composts have been made on the site of the new forest nursery in Wytham Great Wood. These trials have given very satisfactory results and once again demonstrate the beneficial effects to be obtained from the use of these organic composts on natural soils of this type.

Research into the methods of preparing composts from waste materials such as bracken, straw, sawdust and brewery hop waste, has continued at Kennington and Bagley Wood, and trials of the composts for the purpose of improving nursery fertility are yielding most satisfactory results. There are two main objects in this work, one to produce a properly balanced mycorrhizal root system and the other to raise seedlings that can be handled for lining out at the end of the first season.

Three series of detailed factorial experiments have been laid down in Kennington old nursery, in the new extension and in Bagley Wood nursery. This work is being carried out under the direction of a sub-committee of the Forestry Commission Advisory Committee on Forest Research, appointed to investigate nursery nutrition problems.

Experiments on the watering of seed beds and seed boxes and trials of automatic irrigation of seed boxes from below have continued. Other items of research include date of sowing experiments, vegetative propagation of such species as Norway spruce, *Sequoia sempervirens* and *Sequoia gigantea* combined with trials of various growth hormones, and the comparison of the growth of Beech seedlings on various imported soils.

The raising of planting stock for Beech and European larch provenance experiments and for the field trials of varieties of Poplar has continued.

The nurseries and experiments in progress were as usual valuable for instructional purposes, and demonstrations to students were arranged by the Forestry Commission staff as required. On the statistical side, Mr. Day has collaborated in the matter of analysis of experiment assessment data and students have from time to time carried out statistical exercises in the experimental seed beds.

MENSURATION AND MANAGEMENT

Mr. W. J. Lambert continued to hold charge of the section but resigned shortly after the end of the year, his appointment having been for the duration of the war. The *Tsuga heterophylla* (Western Hemlock) sample plot in Bagley Wood was remeasured and thinned. Part of the Easter Vacation was spent in the woods of the Hampden Estate, the first-year students carrying out the field work necessary for preparing a preliminary working plan report, the second-year students carrying out exercises in mensuration and management. Mr. J. W. B. Sisam gave lectures on Canadian cruising methods and some time was devoted to aerial survey work.

Weekly excursions were made during the summer term to woods within a reasonable distance of Oxford. There is little of special interest from the management point of view, and it is hoped that it will be possible to recommence Continental tours in the coming year. The week spent in Norfolk during the summer vacation, mainly in the Forestry Commission plantations round Thetford, provided useful opportunities for considering the management problems arising from the afforestation of a very large acreage in some twenty years.

Research work. Most of the year was spent in attempting to prepare a volume and yield table for Vancouver Douglas fir, using Forestry Commission data and statistical methods. The logarithmic volume equation of Schumacher and Hall, even when supplemented by H. A. Meyer's correction, proved to be inadequate, but a satisfactory alternative was found for preparing the volume table. The yield table attempt has so far proved unsuccessful, as no method of curve fitting tried gives a good fit, the most difficult variable being number of trees per acre. The data show a considerable amount of heterogeneity, and this may prove to be the cause of failure.

STATISTICS

There have been numerous discussions of the statistical problems with which forestry is concerned. These have led to a certain amount of investigatory work which has been concerned with the efficiency of methods used. Two conclusions seem to emerge clearly. Firstly there is an urgent need for a clear statement of principles and methods in the sampling of the conditions and growth over extensive areas (ecological and soil surveys; mensuration surveys); no adequate work exists at present capable of satisfying the needs of practising foresters. Secondly there is undoubtedly a need in silvicultural experimental work in this country, to consider much more closely what type of layout will permit of adequate statistical analysis in order to obtain the results which experiments are planned to give. The time would appear to be ripe for a technical publication to cover these two aspects of statistical method as applied to the needs of forestry, and it is hoped that the appointment of a University Lecturer in Design and Analysis of Scientific Experiment will hasten its appearance.

For reasons of administrative convenience, the new Statistics section remained under Mr. Day's supervision though undertaking work for all sections needing it. Miss Faulkner has proved to be an efficient and capable computor and her help throughout the year has been most valuable.

SOIL SCIENCE

Under the arrangements which have been current for the past several years, instruction in this subject was given by Mr. C. G. T. Morison, Reader in Soil Science, and Mr. G. R. Clarke. They also supervised more advanced work done by some of the senior students. The soil survey study in Caio forest was continued.

FOREST BOTANY

Accessions exceeded 140 specimens, most of which have been identified, mounted and filed in the Herbarium. Only some 800 specimens were mounted owing to the continued lack of technical assistance. A considerable reduction was, however, effected in the number of mounted specimens awaiting filing, thanks to the help of Mr. Brenan and the senior students, but arrears of mounting and filing remain formidable. The Herbarium and ancillary rooms were re-organized to make more working space available and to provide more cupboards to house mounted specimens.

Tuition and demonstrations were given to two first-year Forestry students by the Curator, Mr. A. C. Hoyle, who also supervised and collaborated in special investigations by two probationary Forest Officers from Nigeria, Mr. A. P. D. Jones and Mr. R. W. J. Keay, into the taxonomy and ecology of West African Tropical vegetation. This involved much mutually profitable discussion and research, and several joint visits were made to the Kew and British Museum Herbaria to examine specimens not available in Oxford. Numerous plant names have been corrected, and revisions of groups of species in several ecologically-important genera (notably *Acacia, Combretum, Terminalia, Uapaca, Isoberlinia* and *Lannea*) are proceeding or have been completed as far as present conditions permit. Collaboration by letter with the French Academy of Natural Sciences in Paris has enabled the confused nomenclature of several species to be cleared up, and a foundation has been laid for further useful co-operation with the Paris Herbarium.

Progress was made by the Curator in writing up his revision of the genus *Brachystegia*. An account of the soil and vegetation of the South Western Sudan has also been re-arranged and partly re-written in collaboration with Dr. Hope-Simpson, who was fortunately stationed in Oxford for most of the year, and with Mr. Morison. Since the need for adequate presentation of the illustrations to this paper is likely to delay its publication for some time, an advance copy is being prepared for the Sudan Government. Meanwhile, joint lectures and demonstrations by Mr. Morison and the Curator, on the principles of the soil and vegetation classification

used in the paper, have been given to Forestry students and to visitors from this county and abroad.

The number of official and private enquiries and visits to the Herbarium has been above the average for recent years. The particularly welcome visit of Professor Jean Louis, from Brussels, has opened up possibilities of profitable collaboration.

Progress was made by Mr. J. P. M. Brenan during the year in the last stages of preparation of the Check-list of Tanganyika Territory, and it is hoped that it may soon be possible for it to go to press. In connection with this check-list several visits have been made to the British Museum Herbarium at Tring and Turville, and also to the Royal Botanic Gardens, Kew, and it has thus been possible to examine much Tanganyika material unrepresented at Oxford. A large number of determinations of Tanganyika Territory specimens have been made, and special investigations have been made in *Acacia, Memecylon, Hermannia, Dombeya, Strombosia,* and several genera of *Rubiaceae.* Various interesting specimens from the Territory have also been received from Mr. P. J. Greenway, of Amani, whilst Mr. L. T. Wigg, of the Tanganyika Territory Forest Service, gave much help in criticising and adding to the check-list while on leave.

Some preliminary work has been done on the woody plants of Northern Rhodesia, including an extensive bibliographical search for relevant papers and records. Several Northern Rhodesian genera, including *Dalbergia, Afrormosia, Swartzia* and *Ostryoderris* in the Papilionaceae, and the whole of *Apocynaceae* have been revised in the herbarium, involving study of all the species in South Tropical Africa.

During the year, Mr. Harold E. Box presented to the Herbarium a splendid set of his collection of *Cola* in West Tropical Africa. Besides dried specimens, this set included a valuable and extensive collection of flowers and fruits in formalin. *Cola,* belonging to the family *Sterculiaceae,* is a large and difficult genus of much importance in the rain-forests of West Africa, where it is widespread. The identification of Mr. Box's plants involved taking into account the whole genus, and, in collaboration with Mr. A. P. D. Jones, of the Nigerian Forest Department, much progress has been made towards a revision. This will be a work of years and will involve careful observation and collection in parts of Africa that are still remote and difficult of access. We should be very glad to receive any material of this genus from any part of Africa; it should be sent to Mr. J. P. M. Brenan at the Imperial Forestry Institute. A note was published by J. P. M. Brenan in *Journ. Arn. Arb.* 26, 212-3, 1945, entitled 'The Generic Name Petalonema.'

FOREST PATHOLOGY

Mr. W. R. Day continued in charge of the Section with Mr. F. H. Jones as senior and Mr. D. K. Barrett as junior assistant.

The Assistant Mycologist continued absent, acting as District Forest Officer in the Forestry Commission.

Teaching. The usual courses of instruction were given in forest pathology and hygiene.

Research. Analysis of data from felling areas. A certain amount of progress has been made with the analysis of correlation between incidence of butt rot and silvicultural factors, but this work has not been completed owing to pressure of other work. It is hoped to make a report in 1946.

Die-back and needle cast of Corsican pine. Further work on this matter has fully confirmed the importance of frost as a cause of die-back of Corsican pine in the west and north of England and in Wales. One further instance of needle cast associated with *Hypodermella sulcigena* has occurred in the north of England. This form of needle disease, in which not infrequently the basal quarter or fifth of the needle remains alive, has also occurred in association with *Sclerophoma pithyophila* v. Höhn., in North Wales. Four different species of fungus are known to have occurred on needles affected in this manner, at different times and in different places in this country, and it seems not improbable that some more fundamental factor than any of these is concerned in the development of the disease. A paper, in which die-back of Corsican pine due to frost injury is discussed will be published shortly. An investigation has also been made into the dying of Corsican pine in Llantrisant Forest in South Wales. Examination of the data collected is not yet completed but it is hoped to make a report on this work during the present year. The cause of death is probably a root disease.

Mr. F. H. Jones reported Corsican pine dying in Pembrey Forest. The principal cause of disease here was exposure to strong sea wind and the affected trees were confined mainly to exposed places on sand dunes near to the sea shore.

The silviculture and pathology of European larch. This work is being done in collaboration with Mr. Sanzen-Baker. The analysis of data collected in connection with this work is being proceeded with and is being carried out by Mr. Zukowski, assistant to Mr. Sanzen-Baker. Mr. Sanzen-Baker and Mr. Day also made a tour of selected forests in Scotland. It was quite clear from what was seen that the serious dying back of European larch that occurs in some forests, is of the same nature as that which occurs in England and Wales. The association between severity of disease and topographical position, which has been observed so frequently elsewhere, was clearly demonstrated in Scotland. An examination of material sent from Clashindarrock Forest earlier in the year showed clearly the direct connection between frost injury and die-back, and there is no doubt that this association occurred generally wherever the typical die-back and canker of larch was seen.

The effect of coal dust on forest trees. Mr. F. H. Jones investigated an area in South Wales in which lack of vigour in trees was suspected to be caused by deposits of coal dust from a neighbouring

colliery. A comparison of trees within and without the affected area showed that, with the possible exception of trees in the immediate vicinity of the source of the dust, it was very improbable that this was in any way responsible for poor growth, in so far as this occurred. The principal adverse factors were almost certainly to be found in naturally adverse soil conditions. Some very interesting and rather exceptional examples of almost complete defoliation of Japanese larch by larvae of the larch leaf Miner were seen in this area.

The dying of Scots and Corsican pine in East Anglia. This is serious in some plantations of about twenty-two years of age. Mr. Morison, Reader in Soil Science, and Mr. Day, made a short survey of the affected areas in April (1945) and made suggestions with regard to further investigations required. The dying off is apparently caused by *Fomes annosus*, but an attempt will be made during the present year (1945) to determine whether this fungus or some other is a parasite of primary importance, and whether there is any indication that site factors of non-biotic origin play some part in this matter.

The dying of Japanese larch in Llantrissant Forest. This is locally serious in well-grown plantations of about twenty-two years of age. The present indications are that a species of *Phytophthora* is the primary parasite. The matter is, however, still under investigation; it is hoped to report on it during the present year (1945). The occurrence of this locally serious disease is of some importance in view of the considerable area of plantations of this tree in Wales and elsewhere. Mr. F. H. Jones has been responsible for the field work in connection with this investigation.

Other items of interest. Further examples of canker on Poplar in which frosts were clearly the cause have been observed. The frosts at the end of April, 1945, caused very severe injury in young plantations over widespread areas of Britain. The Spruces, and in particular Sitka spruce, have been very severely affected. Some of the forests visited in Scotland in July (1945) were the same as some of those examined in 1935 after the severe frosts which occurred in May of that year. It was interesting to observe that forests which then escaped lightly again suffered little injury, while those which suffered severely again included severely injured plantations. This constancy in liability to injury by frost was clearly related to the topographical character of the forests concerned, as has already been described in the *Bulletin* 'Spring Frosts' (H.M.S.O., London, 1937).

Publication. 'On the importance of the study of Systematic Mycology for Forestry.' *Forestry*, Vol. XVIII, 1944, pp. 49-50.

FOREST ENTOMOLOGY

Lectures and Laboratory Instruction. The prescribed syllabus was covered by Dr. R. N. Chrystal.

One of the senior students, Mr. G. R. Fenton, initiated a study on the relation between soil fauna and vegetation types, and carried out work which it is hoped to complete and publish in due course.

Research. Surveys were made of insect relations in several recent plantings of conifers near Oxford (Tubney). Two of these plantations, mostly larch with a few Corsican pine, were in the immediate vicinity of pine woods being felled by the Timber Supply Department. These had suffered a mass attack of *Hylastes* in the late summer, and intensive trapping has had to be carried out. It is hoped that the most vigorous trees will be able to survive the attack.

The Douglas fir Adelges. During the winter and early spring, studies were made at Tubney of the distribution of the overwintering population (*sistens* stage) of the *Adelges* on the Douglas. These were made to ascertain the density of distribution of these wintering forms on the leading shoots and first branch whorls, as compared with those on the shoots lower down the tree. These counts showed a comparatively sparse distribution of the *sistens* on the leaders and first whorls, as compared with that on the branches lower down the tree, especially on the inner portions of these lower branches. Similar counts made at Staple-Edge (Forest of Dean) and in the Coed-y-Brenin forest, North Wales, confirmed these findings.

This concentration of the *sistens* on the lower parts of the tree determines the location of the greatest number of predators which feed on the egg-masses concentrated there. Studies made on a plantation in the Coed-y-Brenin forest, showed a marked concentration of predators on the lower branches as compared with the leaders and first two whorls.

Further interesting points relating to the distribution of the predators were:—

(*a*) In young plantations (Planted 1942, *i.e.*, 3 years old) at Penrhos, Coed-y-Brenin, where the attack is heavy on only a small percentage of trees, (10 per cent.), moderate on 25 per cent., and negligible on the remainder, there was practically no predator population present.

(*b*) At Cae-Cyrach, Coed-y-Brenin forest, where on the upper slopes there are open groups of Douglas fir planted under oak, of 150 trees examined, 18 per cent. showed heavy attack all over the tree. On these trees, it was to be expected that a good population of predators would be found. Actually, no Coccinellids were present, no Neuropterous larvae, and only a very few Syrphid larvae. On the lower slopes of the wood, the trees were planted in lines and the plantation is just entering the 'thicket' stage; at these lower levels, the predators were again found.

At Tyn-y-Benthros, Coed-y-Brenin forest, thinnings which were being made in a 17-year-old stand, were examined. The trees ranged in height from 22 feet to 35 feet 6 inches. On only one of these trees, the general growth of which was very poor, was there heavy *Adelges* attack generally distributed over leader and side shoots

of the first two whorls. On another tree, the leader of which had been killed by frost, and the side shoots also partly damaged, growth was also very poor, but the *Adelges* attack was not nearly so heavy as on the former tree. No predators were observed upon these trees.

Spraying experiments were started at Tubney wood, and in the Forest of Dean, with a view to comparing growth on infested trees with that on trees kept free from the insects.

Spruce aphis. In North Wales, an interesting example of a rapid and complete recovery of a Sitka spruce plantation from severe attack by spruce aphis, was recorded. In 1942, this plantation was so severely attacked that a considerable portion of the area looked as though it had been swept by fire. This summer, the trees have completely recovered, traces of the aphis are very hard to find, and the only remaining evidence of the attack is the absence of needles on all shoots up to the year 1943. There has been no attack subsequent to 1942. It is fortunate that this aphis attack did not occur during the present season, when the damage by frost has been so severe on the Spruce among other species. Had this been the case, heavy damage would have occurred.

WOOD STRUCTURE

First and second year courses were given by Dr. L. Chalk, who continued in charge of the section.

Owing to the cessation of various duties connected with the war, much greater progress was possible on his standing major item of research, *viz.*, the systematic anatomy of dicotyledenous woods; the number of families completed was more than double that of either of the two previous years and the first draft should be completed within about 12 months. Illustrations for nearly 60 families were also prepared.

The number of timbers received for identification was again rather few, though showing an increase over the previous year. Additions to the wood collection were again very few, only some 44 specimens being added, most of them through the Royal Botanic Gardens, Kew.

Publication. The taxonomic value of wood anatomy. Proc. Linnean Soc. Sers. 155 P. + 3, pp. 214-18, 1944.

FOREST ECONOMICS

The usual course of instruction in this subject was given by Mr. W. R. Day. Several of the weekly discussions touched on economic problems, and it is satisfactory to be able to record that after the end of the year, Mr. J. J. MacGregor was appointed Lecturer in Forest Economics.

FOREST UTILISATION

Dr. Chalk again gave the necessary courses in Forest Utilisation. Excursions from Oxford included visits to the Forest Products Research Laboratory, Princes Risborough, and to the Wolvercote

Paper Mills, the latter through the courtesy of the Clarendon Press. During the summer vacation tour, visits were made to the Denny Wood Sawmill near Lyndhurst, the wood preservation plant of Messrs. Burt, Boulton and Haywood, Ltd. at Totton, and the plywood factory at Lydney (thanks to facilities given by Mr. A. G. Allen of Factories Direction Ltd.)

Colonel Lloyd has returned since the end of the period of this report on release from H.M. Forces and the teaching of Utilisation aspects of forestry will be considerably expanded.

SURVEYING

Mr. O. H. Chilton, gave the regular course in surveying to the first year students.

FOREST ENGINEERING

Mr. O. H. Chilton, Reader in Surveying, once again kindly undertook the teaching of Forest Engineering and acted as Assessor in the examination in this subject. Colonel Lloyd will now take over the work of this section.

LIBRARY.

The year's record is most simply indicated by statistical data, as follows:

Accessions: 1934. Separate issues of periodicals, 798; books, 46; other items, 550.

NOTE: The Imperial Forestry Bureau provided 212 items; 48 were obtained by request; one book was purchased by the Brooks Fund; and gifts from various donors, named later in this report, totalled 39. The number of accessions is lower than that of last year by 104.

Loans. 3,777. To staff, 1,484; to Bureau, 1,260; to students, 480; to visitors and correspondents, 553.

NOTE: The total number of loans is not much higher than last year (3,418), but those to students were more than twice as many (221), and to the Bureau about 200 more (1,055). Outside borrowers were many fewer (700). A large proportion of postal loans were made through the Bureau; many others were made to the Department of Scientific and Industrial Research, and to the Imperial Mycological Institute.

Readers in library. About 2,700. Staff, including Bureau, about 1,070; students, about 1,130; visitors, 510.

NOTE: Exact figures are not available except for visitors, as record was not always made. The total is considerably higher than last year's (2,180), owing chiefly to the increase in student-periods (from about 600). Our visitors, nearly all of whom sought information, included persons from New Zealand, Canada and Poland and the United

States, all but a few of these being in the Services. The Admiralty staff dealing with Far East matters came frequently to read and to borrow.

Current Periodicals. 104, four more than last year. The whole number of periodicals held is 210.

Series other than periodicals. Since our last report, 26 series have been opened in our files, bringing the number of current headings to 1,044. Three of these come from the U.S.S.R., one from Venezuela, one from Argentina; also the first from Belgium since 1940. Altogether, we hold 1,239 separate series, composed of bulletins, circulars, annual reports, and working plans.

NOTE: For help in obtaining issues of Continental journals during and since the war, we thank the British Council, H.M. Stationery Office, and Sir David Chadwick, Chairman of the Imperial Agricultural Bureaux. Titles of all our periodicals and series are at present being listed for publication in pamphlet form, and also for the use of the Union List of Periodicals in its new edition.

Enquiries by post. 19. The bulk of enquiries received were handled by the Bureau; of the nineteen answered by the library, one was from a professor in Greece for help with which we are indebted to the Director of the Royal Botanic Gardens, Kew (who presented a copy of the Kew Bulletin for transmission, and permitted us to copy an article from a German periodical at that time on deposit in the New Bodleian), and to the British Council (who obtained and sent to the enquirer several catalogues of scientific instruments at our request). Examples of early engravings of British trees were traced for the 'Britain in Pictures' series. The other enquiries were chiefly for bibliographies on different subjects.

Letters and Sales. Letters received, 379; sent, 415. Sales in the library amounted to £10 3s. 0d.

Catalogues. New cards added during the year totalled 13,373, compared with 11,110 in 1943-44. These consisted of 9,268 subject cards and 4,105 author cards, mainly for current material. The total number of filed cards on 31st July, 1945 was: Authors 16,381; Subjects 33,778.

Typing of reclassified references. Typing of 1936-38 material was almost completed with a total of approximately 10,000 references. It is estimated that it will have taken one full-time typist nearly one and a quarter years to complete the typing of the 1936-38 material.

Benefactors to the library during the year include not only givers of books; we must also thank Bodley's Librarian for two large bookcases of great utility, and the Librarian of the Edinburgh University Library for accepting books on loan to be read there by a Polish officer; also Colonel Lloyd and Major Hide for seeking, during their army service in Europe, for publications on forestry for our use; and the Official Seed-Testing Station at Cambridge, the Director of

Kew Gardens, and the British Council, in particular reference to the Greek enquiry mentioned above. Donors of books include again Major Hide, who gave us about 35 valuable works on West Africa; the late Ven. Archdeacon Lonsdale Ragg; Professor Osborn, for a Dutch work of 1773, with many coloured plates of timber specimens; Sir Gerald Trevor; Dr. John Johnson; Dr. S. E. Wilson; Professor Louis (Jardin Botanique de l'Etat, Brussels); Dr. Chalk; Mr. M. S. Parry; Dr. E. W. Jones; Dr. Kissin; Mr. H. E. Box; Mr. J. P. M. Brenan; Mr. Ll. Williams, of Venezuela; The Empire Forestry Association; The High Commissioner for India; the Anti-Locust Research Centre, Algeria; the American Embassy, London; The Rhodes Trustees; the School of Rural Economy, Oxford. Warm acknowledgement is made to these persons and institutions for their help.

FINANCE

The audited accounts of the Department will be published in the Oxford University Gazette. The following is a summary of income and expenditure for the year:—

GENERAL ACCOUNT.

Income. Forestry Commission, £3,593; Colonies, £4,767; Colonial Development and Welfare Fund, £180; Curators of the University Chest, £386; Dominions, Burma and others, £483; other receipts, £79. Total Income, £9,488.

Expenditure. Staff Salaries and Pension Contributions, £7,480; Instructional Supplies, £42; Travelling, £282; Administrative and Miscellaneous Expenses, £1,217; Instalment on loan from Capital Account, £50. Total Expenditure, £9,071.

Towards the close of the year, the Secretary of State for the Colonies approved a project whereby the sum of £25,500 should be contributed from the Colonial Development and Welfare Fund to the Institute for a period of six years from 1945-51. At the same time the several colonies have agreed to continue their current contributions for the same period, and the University agreed to make a further contribution up to the £1,960 estimated to be required on the basis of 1939 rates, to carry out the proposed scheme for post-war activities. Owing to the delay in declaration of Government forestry policy, the Forestry Commission have not yet been in a position to make the additional grant of £1,500 yearly asked for from them under the same scheme. The general increase in salaries, cost of materials, etc., has made a considerable increase on the 1939 figures inevitable, but it is hoped that this will be largely met by the University.

H. G. CHAMPION,
Professor of Forestry
(On behalf of the Committee for Forestry).

APPENDIX I

LIST OF STAFF

I. STAFF ENGAGED IN INSTRUCTION AND RESEARCH

PROFESSOR H. G. CHAMPION, C.I.E., M.A. (Oxon.). Tropical Forestry, Forest Policy.

*L. CHALK, M.A., D.Phil. (Oxon.). Wood Structure and Properties.

*W. R. DAY, M.A., B.Sc. (Oxon.). Pathology, Forest Hygiene.

*A. H. LLOYD, O.B.E., M.C., T.D., M.A. (Oxon.). Forest Engineering and Utilisation.

*R. N. CHRYSTAL, D.Sc. (Edin.), Hon. M.A. (Oxon.). Forest Zoology.

†N. V. BRASNETT, M.A., Dip. For. (Cantab.), Forest Management and Mensuration.

J. J. MACGREGOR, B.Sc., M.S. (Wisc.), B.Litt. (Oxon.). Forest Economics

‡E. W. JONES, M.A. (Oxon.), Ph.D. (Cantab.). Silviculture.

W. R. C. HANDLEY, Ph.D. (Leeds). Microbiology.

L. LEYTON, Ph.D. (Leeds). Tree Physiology.

G. W. DIMBLEBY, M.A., B.Sc. (Oxon.). Forest Ecology.

‖J. P. M. BRENAN, B.A. (Oxon.). Tropical Forest Botany.

II. STAFF ENGAGED SOLELY IN RESEARCH FOR THE FORESTRY COMMISSION

R. G. SANZEN BAKER, B.Sc. (Edin.). Forestry Commission Research Officer for England and Wales. Silviculture.

III. STAFF OF OTHER UNIVERSITY DEPARTMENTS ASSISTING IN INSTRUCTIONAL WORK

A. C. HOYLE, M.A., B.Sc. (Oxon.). Forest Botany and Ecology.
C. G. T. MORISON, M.A. (Oxon.). Soil Science.
G. R. CLARKE, M.A., B.Sc. (Oxon.). Soil Science.
O. H. CHILTON, M.A., M.Sc. (Lond.). Surveying.
D. J. FINNEY, M.A. (Cantab.). Statistical Methods.

IV. OTHER STAFF

Secretary-Accountant: MISS H. M. EDWARDS.
Acting Assistant Secretary: MISS J. M. POLLARD.
Librarian: MISS G. GUINEY.
Assistant Librarian: MISS I. S. T. ASPIN, M.A. (Oxon.).

*These members of the Staff have the status of University Demonstrators, having been re-appointed as such with effect from the following dates: Mr. Lloyd, 1/8/44 for one year; the remainder, 1/8/44 for three years.
†Mr. N. V. Brasnett was appointed for one year from 1/10/45.
‡Mr. E. W. Jones was appointed University Demonstrator on 1/10/40.
‖Mr. J. P. M. Brenan was re-appointed for one year from 1/8/44.